WESTERN BIRDS

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WESTERN BIRDS

Quarterly Journal of Western Field Ornithologists

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WESTERN BIRD PHOTOGRAPHERS

ARNOLD SMALL, 608 N. Camden Drive, Beverly Hills, California 90210

I have known and photographed wildlife with Keith Axelson of Los Angeles for almost 20 years and during this friendship we have even photographed the same subjects together. And yet, when comparing results later I found that Keith had seen the subject from a much different mental perspective than I and this is what makes photography a truly creative art.

Keith's work always makes me envious because I know that he has the true artist's sense of creativity in his photographs. Other photographers whose work I have seen are technically excellent and except for the subject matter, seem to have been produced by a duplicating machine. No two of Keith Axelson's photographs ever seem to be the same although the *style* is unmistakable. I think that I would recognize Keith's work if hung anonymously among a hundred others.

Although I have seen Keith's color productions, his better medium is black and white. His careful use of the frame, cropping, nuances of tone, light, and shadow, and excellent composition are not restricted by the limitations of color film. Other photographers whose work has been exhibited in *Western Birds* would have benefited had their photographs been reproduced in the original color.

Keith Axelson is the editor of *Audubon Imprint*, the newsletter of the Santa Monica Bay Audubon Society and his creativity is evident in the superb quality of this bimonthly publication. He is a conservation activist with a deep and abiding love for the desert and as such has worked closely with the Bureau of Land Management in preserving the unique beauty of Butterbread Spring and Kelso Valley in Kern County. By profession Keith is an artist and designer but his real love is for wild things and wild places.

PHOTOGRAPHY: ANOTHER VIEW

KEITH AXELSON, 3262 Midvale Avenue, Los Angeles, California 90034

Nature photography, to me, should be approached with the idea in mind to capture your personal appraisal of the natural world around you. I believe almost all the technically perfect photographs have been taken. What's left? Your own point of view—which no one can really imitate. Some execute it better than others, however. I also believe that the true artist (with the camera) is seldom completely satisfied with his work. This then creates a continuing drive throughout life.

Rarely have I used any source of illumination other than available light, consequently I take few pictures of owls. My interest lies mainly in depicting birds in flight whenever the opportunity arises. A distinct, sharp image on the print paper need not always be the prime requisite. How often does one see the subject this way in the field?

I use as few films as necessary, but I do not ever take a color photograph with the idea that I can always make a black and white print from it later. Transmission loss is a major factor. Consequently, both a black-and-white camera and a color camera should be at hand at all times. For black and white photography, I use Tri-X most of the time, with Plus-X as an alternate. Other than that, film is the medium and I feel its grain or speed should not be a limiting constraint in shooting an unusual photograph.

Originally, because of weight considerations, I settled with the Pentax system. After years of use, I have found no particular reason to change and have up-dated cameras from time to time. The Spotmatic has been most satisfactory and, as yet, I have not come to revere the completely automatic camera.

The lens used most is the earlier model Takumar 500mm, f5 telephoto. This lens has a rack and pinion focus and, mounted on a rifle stock, provides a combination hard to beat for quick, positive focusing. I alternate between this 500mm and the Takumar 300mm, which I consider an extremely fine lens. Other lenses are utilized and vary from 17mm to 1000mm (Celestron).

Turkey Vulture *(Cathartes aura)*, Porterville, California, September, 1974, 300mm lens, F8.0

Willets *(Catoptrophorus semipalmatus)*, Ventura, California, October, 1973, 500mm lens, F9.0

Sandhill Cranes *(Grus canadensis)*, Malheur National Wildlife Refuge, Burns, Oregon, October, 1971, 500mm lens, F8.0

Turkey Vultures *(Cathartes aura)*, Lompoc, California, October, 1970, 100mm lens, F8.0

Pintails (*Anas acuta*), Ventura, California, November, 1976, 500mm lens, F16

Cactus Finch *(Geospiza scandens)*, Galapagos Islands, Ecuador, July, 1973, 135mm, F16

Red-billed Tropicbirds *(Phaethon aethereus)*, Galapagos Islands, Ecuador, June, 1975, 300mm lens, F16

Wood Stork *(Mycteria americana)*, Ventura, California, 1972, 300mm lens, F8

Ring-billed Gull *(Larus delawarensis)*, Goleta, California, July, 1973, 300mm lens, F5.6

Burrowing Owl *(Athene cunicularia),* Zuma Beach, California, July, 1970, 135mm lens, F8

SUMMER BIRDS OF A LODGEPOLE-ASPEN FOREST IN THE SOUTHERN WARNER MOUNTAINS, CALIFORNIA

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The Warner Mountains occupy a narrow strip approximately 15 km wide and 160 km long running north and south in extreme northeastern California and southeastern Oregon. Geologically the range is the westernmost of the basin ranges which file eastward into Nevada and Utah and is characterized by tilted fault blocks of lake bed sediments interbedded with volcanic sediments and basalt (Oakeshott 1971). In contrast, affinities of its boreal avifauna lie most closely with the adjacent Sierra Nevada and Cascade Ranges (Miller 1951, Johnson 1970). The flora of the Warner Mountains is largely a mosaic of Great Basin and Sierra Nevada forms (D. Taylor pers. comm.). Summers in the range are hot and dry with occasional and local thunderstorms, and winters are cold with relatively sparse precipitation in at least the southern portion. Little has been published on the birds of the Warner Mountains (Johnson 1970, 1975; Maillard 1927; Miller 1941, 1951). Distributional data and indications of relative abundances of species present are scattered and incomplete. The interrelationships of the bird species and the influences which the area's unique geography and flora have had on bird communities in the range are just beginning to be explored. During the summer of 1975 a mapping census was carried out on the birds of a decadent stand of Lodgepole Pine *(Pinus contorta)* and Quaking Aspen *(Populus tremuloides)* in the Skunk Cabbage Creek drainage of the extreme southern Warner Mountains. The study was undertaken to gather data on bird distribution in the southern area of the range and the importance of various habitat types to individual bird species.

STUDY AREA AND METHODS

The Skunk Cabbage Creek study area (Figure 1) consisted of 27.2 ha (about 67 acres) in the southernmost forested area of the range (41° 10'N, 120° 10'W). The plot was a rectangle 594 m long and 457 m wide, the long side of which faced southeast into the small valley through which Skunk Cabbage Creek flows. The study area ranged in altitude from 2390 m up to 2450 m. The long axis of the plot ran approximately parallel to the contour of the area, and the average slope was an estimated 15%.

The forests in the Skunk Cabbage Creek area are generally patchy and broken with hillsides of sagebrush *(Artemisia)* interspersed with mule-ears *(Wyethia)* and lupines *(Lupinus)*. The low areas around the creek are dominated by perennial bog vegetation with clumps of willows

(Salix) and often extensive areas of corn-lily *(Veratrum)*. The soils on the higher areas are generally light, sparse and very rocky, whereas the soils of the creekside bogs and meadows are dark and heavy. The Skunk Cabbage Creek area has had a history of relatively little disturbance. The major habitat alteration has been periodic summer grazing, and the

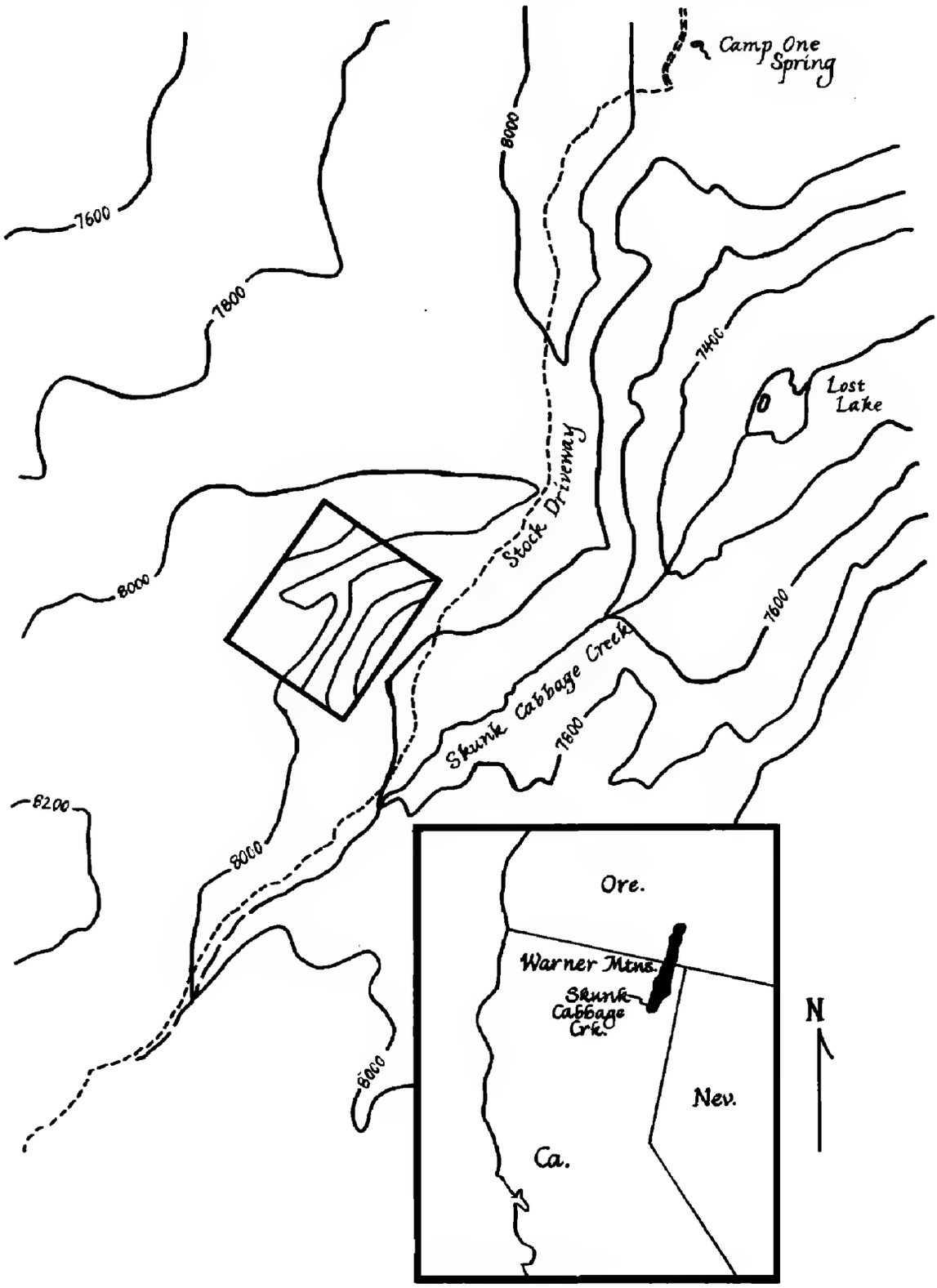

Figure 1. Location map of the Skunk Cabbage Creek study plot. Contour intervals within the plot boundary are forty vertical feet.

area has not been logged. In the early 1960s a stock driveway was constructed up the valley just downslope from the present study area. There has not been a major fire in the area for at least 130 years.

Vegetation types on the plot (Figure 2) were classified as to percent composition of Lodgepole Pine and Quaking Aspen. Each vegetation type was further described by the techniques proposed by Emlen (1956) by sampling at randomly chosen sites within areas of each vegetation type. (Copies of these more detailed descriptions are available from Winkler on request.) Although our initial description of the vegetation used seven different categories of vegetation, several of these classes were lumped together for use in analysis of the bird populations on the plot. The following brief descriptions pertain to these lumped categories.

Lodgepole Forest (9.0 ha, 33% of total vegetation cover): Pure stands of lodgepole are the densest habitat on the plot, with limited visibility, little sub-canopy light and no appreciable ground cover. As aspen occurs in greater proportions, the lodgepole forest becomes more open with sparse ground cover and a shallow litter layer.

Mixed Forest (5.4 ha, 20% of cover): Forest with approximately equal proportions of aspen and lodgepole is heterogenous in aspect, with tall pines interspersed freely with stunted aspen. Ground cover and litter layers are better developed here than in the lodgepole forest.

Aspen Forest (9.5 ha, 35%): This vegetation occurs in two different types of potential significance to avian habitat selection. The dense aspen is the least extensive of the two and is characterized by apparently healthy trees growing to 6-7 m in height and forming a continuous canopy. The open aspen is more common and seems to be the type from which the aspen components in mixed habitats are derived. Ground cover is best developed in the closed aspen and is very sparse in open aspen. Large amounts of litter are found in both habitats, reaching a maximum in open aspen where the density of downed trees and slash often makes walking difficult. The trees in the open aspen are typically sickly in appearance; their foliage is often sparse and pale in color. Insect infestations often reach epidemic proportions in stands of this type. The principal insect pest appears to be the larvae of the tortricid moth, *Sparganothis californiana.* By mid-July a large number of the trees in the open aspen were shedding many leaves, apparently due solely to insect infestation.

Sagebrush (3.0 ha, 11%): This habitat is typically composed of heavy stands of *Artemisia,* often with considerable *Wyethia* and *Lupinus.*

Open Areas (0.3 ha, 1%): In this habitat the substrate is almost continuous rock and the predominant vegetation is low herbs. This designation is used for areas with small sagebrush plants as long as the sagebrush is not dominant. Even with the latter provision, the distinction between

75 - 100 Aspen

50 - 75 Aspen

50 - 50 Mix

50 - 75 Lodgepole

75 - 100 Lodgepole

Rock

Sage

d Dense Aspen

r Scattered Rock

Figure 2 (above): Vegetation map for the Skunk Cabbage Creek study plot. See text for vegetative type descriptions.

Figure 3 (right): Territories of Brewer's Sparrow (thickest lines), Chipping Sparrow (intermediate lines) and Dark-eyed Junco (thinnest lines) on the Skunk Cabbage study plot.

r
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open areas and other vegetation types is often unclear, and in the initial description of the vegetation we resorted to the use of such categories as "rock-sage" and "rock-aspen" in an attempt to express the intermediate nature of certain areas of vegetation.

A grid of 46 m squares was superimposed on the plot by marking the corners of each square with a coded combination of plastic surveyor's tape. Censuses were conducted by walking leisurely along rows between grid markers and recording each contact on a tracing paper overlay of the plot grid. The overlay was marked with a unique symbol for each species and accessory symbols for the behavior in which the bird was engaged (see International Bird Census Committee 1970). A running summation of the location and number of all contacts for all species was maintained. To maximize coverage time during the most productive morning hours and to minimize inequalities in observer coverage, the census was usually divided between two observers who alternated halves of the plot each day. An equivalent of ten censuses were conducted between 30 June and 26 July. Each census involved an average of about six observer hours.

Most species for which sufficient data were collected could easily be categorized by habitat preference and/or the approximate number of breeding pairs on the plot based on superimposition of the species map on the vegetation map. At least three species presented problems in analysis due to their ubiquitous and abundant occurrence. These species, Pine Siskin, Evening Grosbeak and Red Crossbill, were analyzed by determining the number of contacts for each species in each habitat type.

RESULTS

Table 1 presents a list of bird species encountered on the Skunk Cabbage Creek study area along with categorizations of ecological characteristics and avifaunal affinities for each. The categorizations of foraging and predominant food are taken from Johnson (1975:557) or from Bent (1937-1968). When more than one food is listed, the first listed is deemed to be of predominant importance to breeding birds of the species.

Designations of residence and migratory status are based on Maillard (1927) and Grinnell and Miller (1944). The abbreviations and their interpretations are as follows: "LV" represents local visitors, species that are thought to have bred in the vicinity and visited the plot during or immediately after breeding. "MV" designates migrant visitors, species that bred distant from the plot and only visited the plot in the course of their annual migrations. "B" represents birds that are thought to have bred on the plot. "R" is used to signify species that probably stay on or very near the plot throughout the entire year. "AM" represents altitudinal migrants, those which migrate to contiguous lower elevations

in winter. Some altitudinal migrants may leave the breeding grounds only when conditions are severe enough to force them away. "M" signifies species that are latitudinal migrants and typically leave the area for wintering areas to the south before the onset of severe climatic conditions or food limitations. These classifications are among the most subjective made in the study, for little is known of the winter movements of birds in the Warner Mountains, and it is often difficult to characterize the migratory patterns of all individuals in a population with a single designation.

The approximate number of pairs per km^2 was estimated by computing the number of pairs per ha of the species' preferred habitat and multiplying by one hundred.

The "hole-nesting" category includes only species that nest in cavities in trees. Although a Rock Wren nested in a stump cavity, this species is not treated as a hole-nester, for it typically nests in holes among rocks (Bent 1948).

The determinations of avifaunal affinities are based on the lists in Miller (1951) and Johnson (1975).

Habitat preferences were determined by evaluation of the species maps superimposed on the vegetation map. As should be evident from Table 1, the analyses carried out on the Pine Siskin, Red Crossbill and Evening Grosbeak revealed no habitat preferences. Habitat preferences are indicated in Table 1 in the following manner. Habitat types for which a species is judged to exhibit primary habitat preference are indicated by X's appearing in columns beneath the habitat type headings. Numbers in parentheses indicate the number of records in a habitat type when there are very few records. The X's for Lazuli Bunting and White-crowned Sparrow are intentionally placed in an intermediate position between sage and aspen in an effort to express the interface nature of the preferred habitat of these two species.

Table 1. Summary of ecological attributes of the bird species on the Skunk Cabbage Creek study plot. LV=local visitor, MV=migrant visitor, B=breeder, R=resident, AM=altitudinal migrant, M=latitudinal migrant, Brl=Boreal, Gen=General, Aus=Austral. For further discussion of categories and symbols see text.

SPECIES	FORAG-ING	FOOD	STATUS					HABITAT				
			Residence	Migratory	Pairs/km^2	Avifaunal affinity	Hole-nesting	Lodgepole	Mix	Aspen	Sage	Open
Red-tailed Hawk *Buteo jamaicensis*	Soaring search	Verte-brates	LV							Aerial		
Rufous Hummingbird *Selasphorus rufus*	Hovering	Nectar	MV									X
Calliope Hummingbird *Stellula calliope*	Hovering	Nectar	LV									X
Common Flicker *Colaptes auratus*	Ground-bark	Insects	LV							(2)		
Williamson's Sapsucker *Sphyrapicus thyroideus*	Timber drilling	Insects	LV					(1)				
Hairy Woodpecker *Picoides villosus*	Timber drilling	Insects	B	R	11	Brl	+	X		X		
Downy Woodpecker *Picoides pubescens*	Timber drilling	Insects	B	AM	11	Brl	+			X		
Black-bkd 3-toed Woodpecker *Picoides arcticus*	Timber drilling	Insects	LV					(1)				
Empidonax spp.	Sallying	Insects	B	M	33	?	–	X	X	X		
Western Wood Pewee *Contopus sordidulus*	Sallying	Insects	B	M	32	Brl	–			X		
Tree Swallow *Iridoprocne bicolor*	Aerial pursuit	Insects	LV							X		

Clark's Nutcracker *Nucifraga columbiana*	Timber foliage	Seeds	LV					(1)			
Mountain Chickadee *Parus gambeli*	Timber foliage	Insects	B	R	50	Brl	+	X	X	X	
White-breasted Nuthatch *Sitta carolinensis*	Timber bole	Insects	B	AM	5	Brl	+		X	X	
Red-breasted Nuthatch *Sitta canadensis*	Timber bole	Insects	B	AM	11	Brl	+	X	(1)		
House Wren *Troglodytes aedon*	Ground-brush	Insects	B	M	21	Gen	+			X	
Rock Wren *Salpinctes obsoletus*	Ground	Insects	B	M	10	Aus	–				X
American Robin *Turdus migratorius*	Ground-brush	Inverte-brates	B	AM	63	Brl	–			X	
Hermit Thrush *Catharus guttatus*	Ground-brush	Insects	B	M	7	Brl	–	X	X		
Mountain Bluebird *Sialia currucoides*	Ground-brush	Insects	B	M	53	Brl	+			X	
Ruby-crowned Kinglet *Regulus calendula*	Timber foliage	Insects	B	M	11	Brl	–	X			
Solitary Vireo *Vireo solitarius*	Timber foliage	Insects	MV							(4)	
Warbling Vireo *Vireo gilvus*	Timber foliage	Insects	B	M	53	Aus	–			X	
Orange-crowned Warbler *Vermivora celata*	Timber foliage	Insects	MV							(2)	
Townsend's Warbler *Dendroica townsendi*	Timber foliage	Insects	MV							(3)	
Yellow-rumped Warbler *Dendroica coronata*	Timber foliage	Insects	B	M	83	Brl	–	X	X		
Brewer's Blackbird *Euphagus cyanocephalus*	Ground	Insects	MV							Overhead	

Table 1 (cont.)

SPECIES	FORAG-ING	FOOD	STATUS					HABITAT				
			Residence	Migratory	Pairs/km^2	Avifaunal affinity	Hole-nesting	Lodgepole	Mix	Aspen	Sage	Open
Brown-headed Cowbird *Molothrus ater*	Ground	Insects	B	M	19	Aus	–		X	(1)		
Western Tanager *Piranga ludoviciana*	Tree foliage	Insects	B	M	35	Brl	–	X	X			
Black-headed Grosbeak *Pheucticus melanocephalus*	Tree foliage	Insects, seeds	MV							(3)		
Lazuli Bunting *Passerina amoena*	Tree foliage	Insects, seeds	LV								X	
Evening Grosbeak *Hesperiphona vespertina*	Tree foliage	Insects, seeds	B	AM	29	Brl	–	X	X	X		
Cassin's Finch *Carpodacus cassinii*	Tree foliage	Seeds, insects	B	R	67	Brl	–	X				
Pine Siskin *Carduelis spinus*	Tree foliage	Insects, seeds	B	M	67	Brl	–	X	X	X		
Red Crossbill *Loxia curvirostra*	Tree foliage	Seeds, insects	B?	R	29	Brl	–	X	X	X		
Green-tailed Towhee *Pipilo chlorura*	Ground-brush	Insects, seeds	LV							(1)		
Dark-eyed Junco *Junco hyemalis*	Ground brush	Insects, seeds	B	AM	42	Brl	–	X	X	X		
Chipping Sparrow *Spizella passerina*	Ground-brush	Insects, seeds	B	M	60	Aus?	–		X	X		
Brewer's Sparrow *Spizella breweri*	Ground-brush	Insects, seeds	B	M	133	Aus	–				X	
White-crowned Sparrow *Zonotrichia leucophrys*	Ground-brush	Insects, seeds	B	M	33	Brl	–				X	

SPECIES ACCOUNTS

The assignment of any species to a restricted habitat type is somewhat subjective. The following notes for selected species clarify the evidence for each determination and provide additional details.

RUFOUS HUMMINGBIRD: Observed around the major concentrations of nectar-bearing plants from 9 July on. No adult males were observed.

CALLIOPE HUMMINGBIRD: Appeared with the first large concentration of hummingbirds on 19 July.

WILLIAMSON'S SAPSUCKER: Nested in an aspen grove approximately 6 km north of the study plot at Patterson and probably nested adjacent to the plot.

BLACK-BACKED THREE-TOED WOODPECKER: Probably nested in the pure lodgepole forest west of the plot. This species occurred on the study plot in November 1974 (H. Newhouse pers. comm.). This observation, coupled with the fact that our only record for this species on the plot was on 21 August suggests that this species may shift its feeding activities into aspen areas following the breeding season.

EMPIDONAX SPP.: No members of this group were examined in the hand; therefore, no definite specific identifications were made. On the basis of appearance, behavior (type of tail wag) and call note, we strongly suspect that *E. wrightii* was present in the lower sage-aspen areas. Two *Empidonax* nests were found in the upper lodgepole forest on the branches of Lodgepole Pines less than 2 m off the ground. These nests probably did not belong to the *wrightii*-like individuals which we observed predominantly in the lower aspen and were very likely the nests of *oberholseri*.

TREE SWALLOW: Visitor to open aspen only. Probably nested adjacent to the plot and known to nest in aspen at Patterson, 6 km to the north.

CLARK'S NUTCRACKER: Only seen flying over the plot or once perched high in a Lodgepole Pine. Probably nested in the alpine country to the north and visited the area after breeding, for this conspicuous species was not seen until 21 July.

ROCK WREN: One nest with three young was found in an aspen stump on the extreme northeastern corner of the plot on 25 July. This pair presumably spent most of its time out of the plot, as this was the only date the species was observed in that part of the area. The other two pairs were restricted to rocky openings in the lodgepole and mixed forests. A Rock Wren was observed singing from the limbs of a Lodgepole Pine approximately 10 m off the ground on 20 July.

AMERICAN ROBIN: Four nests were found, all in aspens about 3 m off the ground. One with two eggs and one with three eggs on 9 July, the latter with two young by 19 July. A third nest had three young on 22 July. The contents of the fourth nest were not examined. This species seems to be reliant on openings in the forest for nesting.

MOUNTAIN BLUEBIRD: Two of the five pairs nested in dense aspen and moved into open aspen feeding their young once the young had fledged.

WARBLING VIREO: Two nests found adjacent to the plot: One about 8 m up in a 10 m aspen and one near the top of a 2 m aspen. The latter had two eggs in it on 10 July, both of which were apparently robbed, as the nest was abandoned by 20 July.

LAZULI BUNTING: Occurred in the open aspen on the northeastern corner of the plot, first appearing 18 July. The singing male in this area was probably a post-breeding wanderer from localities to the north or downslope (Erickson 1968, Pough 1957).

CASSIN'S FINCH: This species tended to move into the lower areas of open aspen as the summer progressed. During the last census periods many of the contacts for this species in the open aspen involved adult birds in the company of small groups of fledglings.

PINE SISKIN: Although this species was seen in small groups (3-5 individuals) throughout the breeding season, there is no reason to doubt the likelihood of its breeding, for territorial defense is very lax in this species (Palmer 1968), and the circling flights of males were observed.

RED CROSSBILL: No definite evidence of nesting was obtained for this exceptionally sporadic species. Although crossbills were observed in all forest types, it is probable that nesting activities, if any, were carried out in the lodgepole forest. The species was observed in large numbers throughout the census period, but large flocks (20-50 individuals) were not observed until 18 July. At least two apparently juvenal plumaged birds were observed in the company of at least one adult in an aspen in the open aspen area on 10 July. Breeding activity for the Red Crossbill has never been reported from the Warner Mountains (Johnson 1975).

DARK-EYED JUNCO: One ground nest found in open aspen contained four eggs on 10 July and on 20 July there were three young with one egg still unhatched.

CHIPPING SPARROW: A territorial encounter between this and the preceding species was observed in the lodgepole-mixed forest interface on 21 July.

BREWER'S SPARROW: Three of the four pairs occupied patches of sagebrush, whereas the fourth occupied the most open area of the aspen with a conspicuous sagebrush understory.

In a study of finches in the mountains of southern California, Cody (1974: 231-240) hypothesized that similarities in the songs of the Dark-eyed Junco, Chipping Sparrow, and Black-chinned Sparrow *(Spizella atrogularis)* have evolved to maximize the efficiency of maintenance of interspecific territoriality between these species. Our data from the Warners (Figure 3) indicate that the territories of the Dark-eyed Junco, Chipping Sparrow, and Brewer's Sparrow are broadly overlapping in the Skunk Cabbage Creek area. The songs of the former two species were often indistinguishable, whereas the song of the Brewer's Sparrow was very distinctive. If the similarities in song between the junco and the Chipping Sparrow have evolved as a mechanism for the maintenance of interspecific territoriality, the mechanism does not seem to be working in the populations we studied.

WHITE-CROWNED SPARROW: A common breeder in the sage-meadow interface immediately downslope from the study area; only portions of two territories reached the plot. A female with a well-developed egg in the lower oviduct was captured and released on 9 July.

One unofficial census was made on the study area on 21 August. At this time flocks of White-crowned, Chipping, and Brewer's sparrows, all with young, were present in the lower open aspen area along with three Townsend's Warblers *(Dendroica townsendi)* and four Solitary Vireos *(Vireo solitarius).* Apparently, as the summer progresses and young are fledged, the lower aspen area takes on increased importance as a feeding area for both breeding birds and migrants. The major food item for many of these birds in the aspen was most likely tortricid moth larvae.

Table 2. Potential indicators of community structure and function on the Skunk Cabbage Creek study plot. See text for details.

	HABITAT TYPE					
	Open	Sage	Aspen	Mix	Lodge-pole	Over-all
% latitudinal migrants	100	100	47	58	46	60
% latitudinal + altitudinal migrants	100	100	80	83	69	84
% tree cavity nesters	0	0	40	17	23	24
% primary insectivores	100	0	67	58	54	68
% Boreal affinity	0	50	79	82	100	75

Table 2 contains a habitat-specific breakdown of some potential indicators of community organization. In the computation of the values in this table, only those birds thought to breed on the study area are considered. The unidentified *Empidonax* flycatchers were left out of the computation of "% Boreal affinity". We have considered primary insectivores to be those species which include insects or other invertebrates as a great majority of their diets during the breeding season. In the analysis of this character we have relied a great deal on published accounts, especially the classic series by Bent (1937-1968) and the recent work of Johnson (1975:557). It is possible that some of the finches should have been included in the category of primary insectivore in view of their propensity to take large numbers of invertebrate prey during times of peak invertebrate abundance and nestling protein demand.

Interhabitat avifaunal similarities were estimated by dividing the number of species shared by both habitats by the total number of bird species in both habitats. Similarity values were calculated both with (St) and without (Sp) five "generalist" species (Mountain Chickadee, Evening Grosbeak, Pine Siskin, Red Crossbill and Dark-eyed Junco). Similarity values for aspen and mixed forests (St=.42, Sp=.21), lodgepole and mixed forests (St=.53, Sp=.30), and lodgepole and aspen forests (St=.33, Sp=.13) were the only values greater than zero. The unidentified *Empidonax* were omitted in the calculations of similarity values.

DISCUSSION

In this study we chose a modified spot-mapping technique following the standards proposed by the International Bird Census Committee (op. cit.) because we were more interested in general spatial relationships than in absolute abundance (for the latter see Emlen 1971). We encountered several difficulties with the techniques we employed, including ambiguities in the code used for census grid corners and inability to see corner stakes on steep terrain with any appreciable ground cover. Another source of difficulty involves the coded designations used for vocalizations: it is best to determine from the outset precisely how each vocalization type in a species' vocal repertoire is to be recorded (e.g., whether as a flight call, territorial call, song, etc.). In the lodgepole and dense aspen forests, the very poor visibility of birds and grid corner markers may have introduced a bias in the data for some species. This is a factor which must constantly be kept in mind during use of the spot-mapping technique. Overcoming this obstacle would probably be possible if a grid with smaller squares was used, allowing a more thorough coverage of the habitat. Additionally, since many of the contacts registered in dense forest involve vocalizations, efforts should be made to proceed much more slowly in the dense areas of a plot.

The major deviation of our study from the majority of bird community studies is the lack of quantitative description of the vegetation. From the beginning we intended to correlate individual species distributions with habitats in only a general way. If more detailed correlations with specific habitat parameters are desired, the techniques employed by James (1971) and Anderson and Shugart (1974) seem to be the best yet developed.

Among the traits von Haartman (1957, 1971) associates with the hole-nesting habit is the tendency for hole-nesting birds to be residents. To meet intense competition for nest holes and potential nest sites, it is to the advantage of hole-nesting species to be present on the breeding grounds as early as possible. This prediction is upheld by our data, as only two (29%) of the seven hole-nesting breeders are migratory ("M" only). This proportion is well below the plot mean and the proportions for any of the other habitats. Flack (1976) and Lawrence (1967) have pointed out the importance of soft-wooded trees, especially aspen, for hole-nesting species. The drilling of nest holes is often impossible for many hole-excavating species in the trunks and branches of tree species with relatively hard wood. Flack has also indicated that hole-nesters will excavate cavities more readily in trees whose wood has been softened by insect infestation or disease. Lodgepole Pine has exceptionally hard bark (H. Newhouse pers. comm.). On the basis of these observations one would predict the highest proportion of hole-

nesting species to be in the aspen on the Skunk Cabbage Creek plot. This is precisely the relationship observed (Table 2).

The aspen contains proportionally more primary insectivores than do any of the other forested vegetation types on the plot (Table 2). Additionally, the highest number of species (15) occurs in the aspen. Deciduous forests harbor more invertebrates per weight of twigs than do coniferous forests (von Haartman 1971). This relationship, coupled with the observation that insects seemed to be more numerous in the aspen than in any other vegetation type during the summer of our study, tend to support the possibility that the higher proportion of primary insectivores in the aspen is a real response in the avifauna to higher prey concentrations in that habitat. Whether higher insectivore levels in the aspen is a condition to be expected every breeding season depends on whether prey levels in that habitat are equally high in all years and whether the insectivore populations respond to varying prey levels through differential fecundity or migration. It is interesting that Kingery (1970, 1971, 1973) reports higher nesting activity in lodgepole mixed with aspen than in pure lodgepole in a series of censuses from Colorado.

As winter comes to the study area, marked changes in the avifauna must result. With the ground covered with snow, the breeders in the open areas must leave, and it is not surprising that all the breeders from these areas are migratory. In the forested areas considerably more cover and above snow forage is available, and there is a reduced proportion of migrants. Additionally, many of the migrants in these areas are altitudinal migrants and possibly only leave the high country when weather and food conditions are at their worst. As cold weather approaches, insect populations collapse and most primary insectivores must leave: of the breeding primary insectivores, fifteen (88%) are either latitudinal or altitudinal migrants.

The similarities between the avifaunas of the different habitat types (see Results) are certainly not surprising, and they reinforce the notion that discontinuities in forest characteristics are perceived similarly by both birds and people.

Reviews of the birds of aspen forests (Flack 1976) and coniferous forest (Wiens 1975) of North America have recently appeared. Comparison with these reports on a species by species basis would be redundant, for, with minor exception, these accounts reinforce our conclusions regarding habitat preference. Comparisons with the work of Johnson (1975) have strengthened our impression that the avifauna of our study area is little different from that of comparable areas in the adjacent Sierra Nevada. This affinity with the Boreal avifauna of the west declines steadily from the fauna of the lodgepole forest down through the forested types and reaches a low in the open area avifauna. Not

surprisingly, the open area avifauna has been derived from the surrounding Great Basin austral areas. It is interesting that many species known to breed in the northern Warners (e.g., Western Flycatcher, Gray Jay and Golden-crowned Kinglet) do not occur in areas of similar habitat in the southern part of the range. This observation suggests that these mountains may have been colonized by Boreal populations from the north and that the avifauna of the southern Warners is relatively impoverished.

The initial findings of this study have potentially significant land management implications. The decadent stands of aspen are apparently of great importance in maintaining the bird populations on the plot. Not only is aspen important as a source of potential nest sites for hole-nesting species, but it appears that the insect populations associated with the aspen are very important for both breeding birds and transients.

Aspen stands probably become more susceptible to disease and insect infestation as they grow older. As a result, it may seem senseless to many land managers to retain old and relatively unattractive stands of aspen which may act as potential reservoirs of infestation for neighboring stands. At least some decadent stands, however, must be maintained until land management personnel better understand the requirements of bird populations that aspen stands of varying ages can satisfy over the variations of the changing seasons and year to year fluctuations. Much the same considerations apply to lodgepole forest. The management of forests for heterogenous age composition should be given the highest consideration in weighing management alternatives until more is known about the relationship between bird populations and the state of their habitat.

ACKNOWLEDGMENTS

The completion of this project would have been impossible without the support of the U.S. Forest Service, Warner Mountain Ranger District, Modoc National Forest. Conversations with Ron Escoño and Hank Newhouse were extremely helpful. We would like to express our sincerest thanks to Hank and all his family for providing us with our home away from home in Cedarville. Many thanks to Rob, Joe, Paul, Robin, Harry, and Hank for helping us pack into Skunk Cabbage Creek. Special thanks to Harry for his assistance during the project's completion. Parts of this paper were presented at the Western Regional Forest Service biologists' meeting in San Francisco in February, 1976; many thanks to Dave Dunaway for his assistance with arrangements there. We

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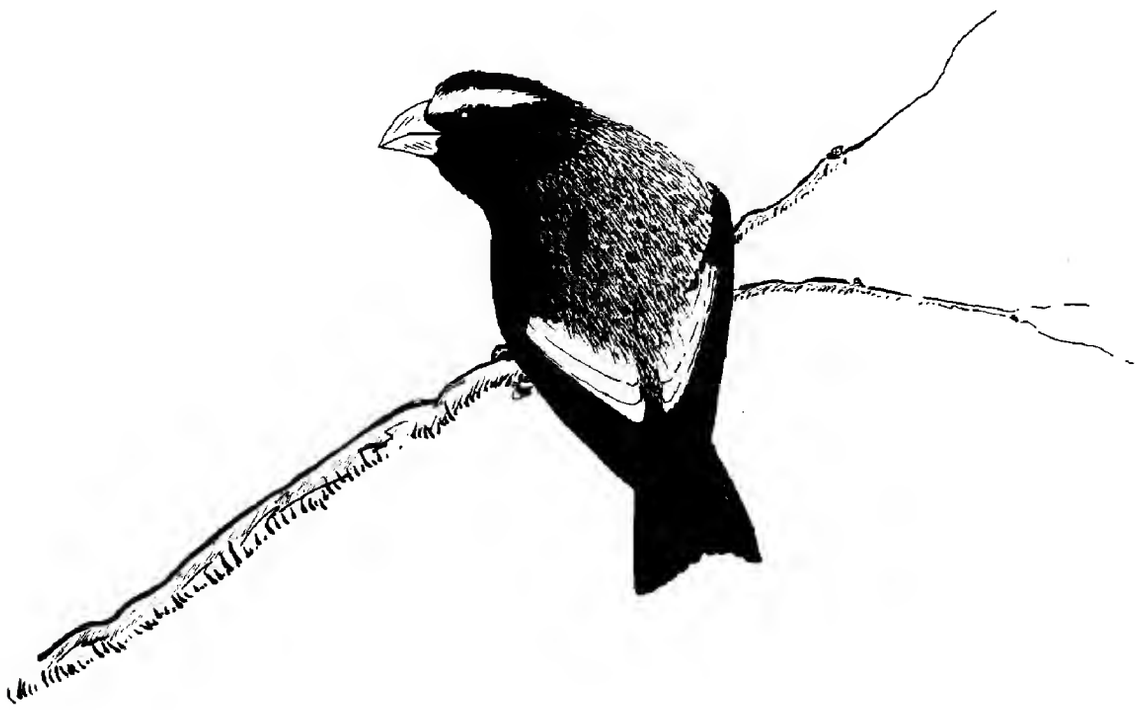

Sketch by David W. Winkler

NOTES

PROTHONOTARY WARBLER IN OREGON

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A Prothonotary Warbler *(Protonotaria citrea)* captured 19 August 1976 in a mist net at Blue Sky, 1920 m elevation on the east slope of Hart Mountain, on Hart Mountain National Antelope Refuge in Lake County is apparently the first record for Oregon. I took it from the net within 1 m of a small stream in riparian habitat dominated by Ponderosa Pine *(Pinus ponderosa)*, Quaking Aspen *(Populus tremuloides)*, and Mountain Alder *(Alnus tenuifolia)*. This hatching-year (ca. 15% skull ossification) male in excellent plumage (no molt in progress), wing chord of 70 mm, and weight of 13.0 g (light fat) was banded, photographed (Figure 1), and released. Two color photographs showing the bright orange-yellow head and neck, the bluish-gray wing and tail feathers, white under tail coverts, and white inner webs of the tail feathers are on file with the Oregon Bird Records Committee and the Hart Mountain National Antelope Refuge.

The Prothonotary Warbler, according to the AOU Check-list (1957), normally breeds eastward from central eastern Minnesota and eastern Texas and southward from southern Michigan and central New York to the Gulf coast and central Florida. It winters from southern Mexico to central Columbia and northern Venezuela. There is one Washington record (Mattocks, Hunn and Wahl 1976) for Benton County in the south central part of the state on 5 September 1970. The northernmost California encounter, of four spring and ten fall records (DeSante and Roberson MS), is for 3 October 1975 on Point Reyes in Marin County on the central coast. The 19 August capture date for the Hart Mountain bird is the earliest fall date for the three Pacific coastal states.

Figure 1. Prothonotary Warbler *(Protonotaria citrea)* caught in mist net on Hart Mountain, Lake County, Oregon 19 August 1976.

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GREAT EGRET PREDATION ON A VIRGINIA RAIL

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At 1330 on 30 January 1975 we observed a Great Egret *(Casmerodius albus)* with a Virginia Rail *(Rallus limicola)* struggling in its bill near Arcata, Humboldt County, California. The egret was standing along the edge of a slough overgrown with Broad-leaved Cattail *(Typha latifolia)* and Water Parsley *(Oenanthe sarmentosa)*. The egret held the rail by the neck for about 7 minutes until the rail ceased to struggle. Throughout the 7 minutes the egret shook its head violently from side to side for several seconds at intervals of approximately 10 seconds. After the rail ceased all signs of life, the egret unsuccessfully attempted to swallow the rail headfirst several times. It was then startled by our presence and, carrying the rail, flew out of sight several hundred meters to a nearby pasture. We walked into the pasture and found the egret again, but it did not have the rail, and its neck did not appear distended as if it had swallowed anything. A Rough-legged Hawk *(Buteo lagopus)* perched about 50 m from the egret was eating a bird approximately the size of the rail. Although we were unable to identify the hawk's prey, we believe the hawk probably pirated the rail from the egret.

Bent (U.S. Natl. Mus. Bull. 135, 1927) reported that ardeids occasionally prey on birds: however, the only previously published records of a Great Egret taking a bird appears to be the reports of Genelly (Condor 66:247, 1964) who saw a Great Egret with a Western Meadowlark *(Sturnella neglecta)* in this same area and Repenning (Auk 94:171, 1977) who saw a Great Egret preying on an unidentified sandpiper in New Jersey.

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LARGE-SCALE MIGRATIONS OF LAND BIRDS AT SEA OFF SOUTHERN CALIFORNIA DURING SEPTEMBER 1975

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Large-scale nocturnal migratory movements of many hundreds of land birds were observed at distances of 100-400 km off the southern California mainland during the period 4-15 September 1975. These observations were made from on board the R/V *Alexander Agassiz*, of the Scripps Institution of Oceanography, La Jolla, California, in the course of a marine biological research cruise to an area just south of the San Juan Seamount (located approximately 350 km west of San Diego, California near 33°N, 121°W) 4-10 September and to the southern end of the San Clemente Basin (located 90-110 km west of northern Baja California, Mexico, in the vicinity of 32°N, 118°W) 11-15 September.

Table 1. Land birds identified at sea 100-400 km off southern California during the period 4-15 September 1975.

SPECIES	NUMBERS
Great Blue Heron (*Ardea herodias*)	1
Osprey (*Pandion haliaetus*)	1
White-winged Dove (*Zenaida asiatica*)	1
Mourning Dove (*Zenaida macroura*)	50+
Western Kingbird (*Tyrannus verticalis*)	1
Ash-throated Flycatcher (*Myiarchus cinerascens*)	2
Empidonax flycatcher	1
Horned Lark (*Eremophila alpestris*)	2
Cliff Swallow (*Petrochelidon pyrrhonota*)	1
House Wren (*Troglodytes aedon*)	1
Orange-crowned Warbler* (*Vermivora celata*)	8+
Townsend's Warbler (*Dendroica townsendi*)	2
MacGillivray's Warbler (*Oporornis tolmiei*)	1
Wilson's Warbler* (*Wilsonia pusilla*)	3+
American Redstart* (*Setophaga ruticilla*)	2
Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)	2+
Red-winged Blackbird (*Agelaius phoeniceus*)	1
Brown-headed Cowbird (*Molothrus ater*)	10+
Savannah Sparrow (*Passerculus sandwichensis*)	2
Vesper Sparrow (*Pooecetes gramineus*)	1
Lark Sparrow* (*Chondestes grammacus*)	1
Spizella sparrows	5+
Lincoln's Sparrow (*Melospiza lincolnii*)	1

*One or more specimens found dead on board R/V *Alexander Agassiz*.

The weather during the entire period of these observations was completely overcast, with 20-30 km/hr northwest winds and air temperatures in our working areas of 15°-20°C. Similar weather conditions apparently existed over the entire offshore area of southern California, from Point Conception to well south of the Mexican border.

The nightly appearances of large numbers of land birds around the ship usually began about 2300 and persisted until at least 0400. The first signs were clearly audible calls from many birds flying over the vessel, which generally was lighted by only its running lights and a few small outdoor lights. When brighter lights were turned on many groups of small birds, ranging in numbers from a few usually silent single birds to loudly calling flocks of 20 or more, would pass in and out of the outer fringes of the lighted areas. Both the calls and the visible birds appeared to be moving generally in the direction of the wind, toward the southeast. Small numbers of migratory shorebirds were mixed in with the land birds. Many of the small land birds appeared quite tired, some actually alighting on the sea surface for occasional periods of a few seconds, then taking off again.

A tiny fraction of the large numbers of migrants were specifically identified by close and unhurried observations of those few that stayed to rest on the ship and were still on board for varying periods of daylight. Twenty-three species were identified in this way, including four species later found dead on the ship's decks (Table 1).

The vast majority of the passerine species identified appeared to be juveniles. Identifiable exceptions to this were an adult male American Redstart and an adult male Red-winged Blackbird. Many of the Brown-headed Cowbirds still showed considerable down. All other species having seasonally variable plumages were in fall plumage.

Significant numbers of terrestrial insects, especially flies, moths and dragonflies, were also observed on board. The smaller of these insects helped to maintain some of the insectivorous birds for a while.

It seems possible that these large numbers of migrants took off originally from the California mainland, the farthest offshore groups perhaps in the vicinity of Point Conception and the northern Channel Islands, which are 100-150 km almost due north of our San Juan Seamount working area.

It also seems probable that large numbers of these land birds did not make it back to shore. Thus, at least for a short time and in a relatively small area of ocean, land birds made a contribution to the food supply of the deep sea.

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OCCURRENCE AND NESTING OF THE LEAST TERN AND OTHER ENDANGERED SPECIES IN BAJA CALIFORNIA, MEXICO

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The California Least Tern *(Sterna albifrons browni)* breeds from San Francisco Bay south along the coast of California to the Mexican border. It has also been reported earlier in the century breeding in Baja California, Mexico, at Scammons Lagoon (Bancroft 1927) and at the tip of the peninsula at San Jose del Cabo (Lamb 1927). There have, however, been no published reports of Mexican colonies in recent years.

In 1969 the Secretary of the Interior classified the California Least Tern as an endangered species because of its exceedingly reduced status as a breeding bird in California. The principle reason for its decline in numbers was loss of suitable nesting habitat. Least Terns once bred on sandy beaches close to estuaries all along the southern California coast. Heavy disturbance of our beaches, plus destruction of estuarine habitats, have forced the birds to use increasingly alien habitats in order to find nesting sites. Recent surveys (California Department of Fish and Game, Sacramento, unpublished reports: Bender 1973, 1974; Massey 1975; Jurek 1977) have established that approximately 600 pairs now return to breed where there were thousands in former times. The number of breeding pairs has remained stable over the past five years, since full protective measures were instituted, but the population is not considered sufficient to ensure the survival of this subspecies in California.

The precarious status of the California Least Tern in the United States gives insistence to the question of whether a reservoir of birds still breeds in Baja California. The recent opening of a new, paved road down the length of the peninsula has made Baja California infinitely more accessible than before 1974. It is now possible to travel the west coast as far south as Laguna Ojo de Liebre (Scammons Lagoon) without a 4-wheel drive vehicle. It has also opened the way for possible development of the great, unspoiled esteros of the west coast, development that could adversely affect the Least Tern and other endangered, estuary-dependent birds. In June-July 1975 Michael Evans, Kristen and John Bender, Dee Dee Rypka, Laura Jenner, Robert Vance, and the author made an exploratory trip to determine if and where Least Terns were nesting on the west coast of Baja California. A detailed report of our findings was made to the California Least Tern Recovery Team.

Our goal was to explore all accessible sites where Least Terns might nest along the coast between the U. S.-Mexican border and Laguna Ojo de Liebre. Least Terns customarily fish in the quiet waters of lagoons and estuaries and nest close by. We visited eight lagoons (Figure 1). While looking for Least Terns, we also checked for two other subspecies that are considered endangered in California, the Light-footed Clapper Rail *(Rallus longirostris levipes)* and Belding's Savannah Sparrow *(Passerculus sandwichensis beldingi)*. Both are residents of the *Salicornia-Spartina* saltmarshes associated with coastal lagoons. Our findings are summarized in Table 1.

A colony of 25-30 pairs of Least Terns was found at El Estero de Punta Banda, just south of Ensenada. The birds were nesting on a saltflat at the south end of the estero. The beaches around Ensenada are heavily used during the tern nesting season, and probably the birds have retreated to the saltflat in recent years, as they have done in many places in southern California. All stages of nesting were

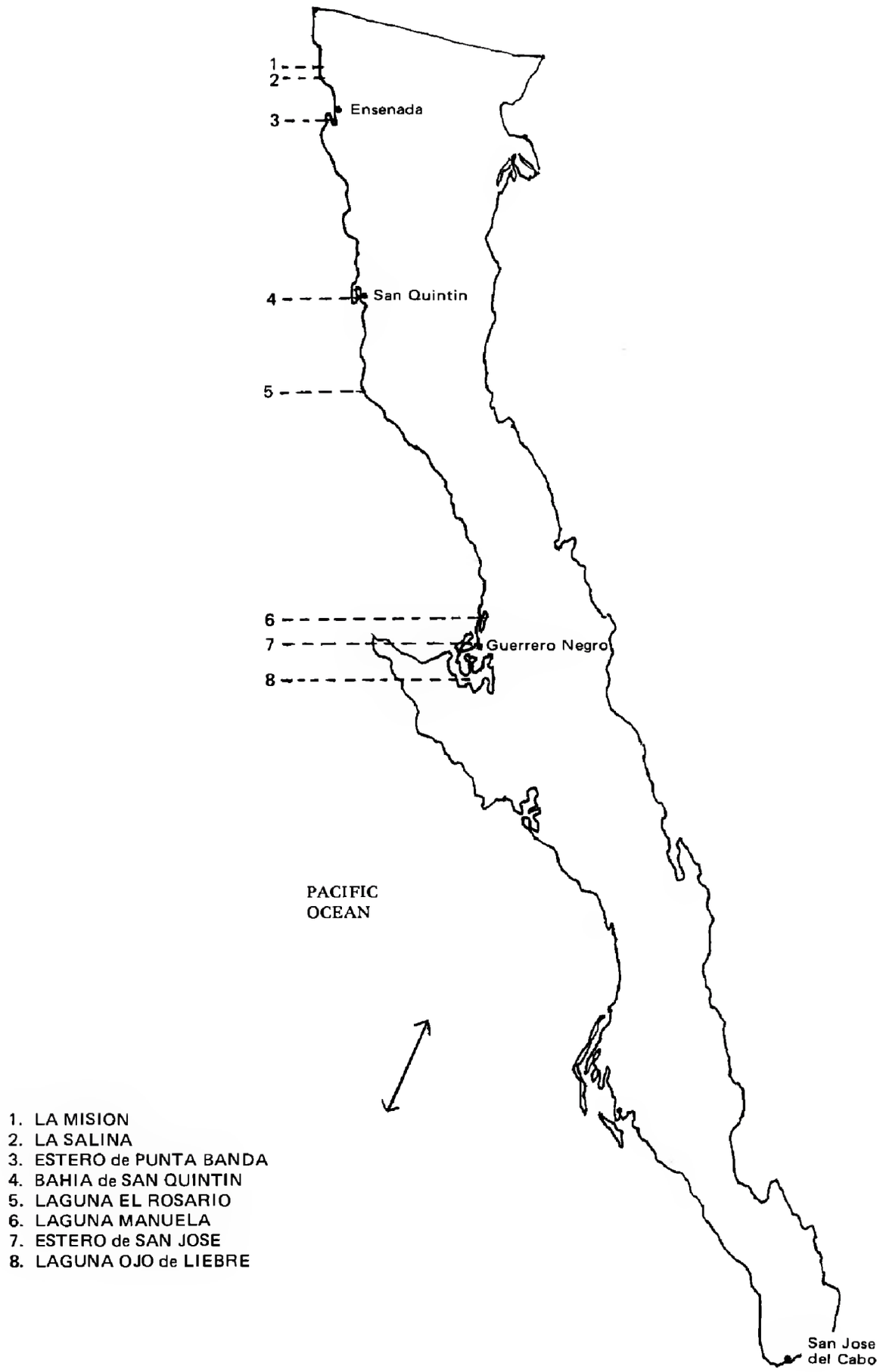

Figure 1. Lagoons of Baja California, Mexico visited in June 1975 in search of Least Tern nesting colonies.

Table 1. Occurrence of the California Least Tern, Light-footed Clapper Rail, and Belding's Savannah Sparrow on the west coast of Baja California, Mexico in late June 1975, South of Bahia de San Quintin, the subspecies *beldingi* of the Savannah Sparrow is replaced by *anulus*.

Location	California Least Tern	Light-footed Clapper Rail	Belding's Savannah Sparrow
La Mision, mouth of Rio San Miguel	absent	absent	abundant, nesting
La Salina	absent	absent	absent
Estero de Punta Banda, Ensenada	25-30 pairs, nesting	present	present, nesting
Bahia de San Quintin	present, presumed nesting	present at south end of bay	abundant, nesting
Laguna El Rosario	absent	absent	–
Laguna Manuela	present, presumed nesting	present	–
Estero de San Jose Guerrero Negro	present, presumed nesting	present	–
Laguna Ojo de Liebre (Scammons)	present, presumed nesting	not observed	–

in evidence, from eggs under incubation to fledged chicks. In July 1976 Least Terns were again nesting at this site (Sanford Wilbur pers. comm.).

At Bahia de San Quintin, Least Terns were fishing in the bay and flying with their catch to the barrier beach (Playa de Oeste Medaro) on the west side of the bay. This beach was inaccessible to us and nesting could not be documented, but the behavior of the birds was consistent with that of adults feeding young (Massey 1974). In July 1976 Wilbur found a small breeding colony on the *east* side of the bay, documenting San Quintin as a nesting site, although the major colony there has probably not yet been found.

The three lagoons around Guerrero Negro are vast and difficult of access, and we could give them only cursory coverage. Least Terns were seen and heard at all three places (Laguna Manuela, Estero San Jose, and Laguna Ojo de Liebre). They were fishing, carrying fish, and vocalizing as they do when breeding and we assumed that there were nesting colonies at all three lagoons.

No Least Terns were in evidence at La Mision (mouth of Rio San Miguel) or La Salina, two likely sites between Tijuana and Ensenada. Nor were there terns at Laguna El Rosario, 50 km south of San Quintin.

The Light-footed Clapper Rail was present at El Estero de Punta Banda, Bahia de San Quintin, Laguna Manuela and Estero San Jose. We found no rails at Laguna Ojo de Liebre, but were able to explore only a very limited portion of the east shore of this vast lagoon, and none of the saltmarsh on the southwest or west sides. Belding's Savannah Sparrows were nesting at La Mision, El Estero de Punta Banda, and Bahia de San Quintin, as has been previously reported (Bradley 1973). South of San Quintin another saltmarsh Savannah Sparrow, *P. s. anulus*, was in evidence at El Rosario, and was abundant in the *Salicornia* marshes of Laguna Manuela, Estero de San Jose, and Laguna Ojo de Liebre.

Between Laguna Ojo de Liebre and San Jose del Cabo there are many large and undisturbed lagoons that should provide ideal habitat for the Least Tern. It is probable that the birds nest all the way to the tip of the peninsula, since they were breeding at San Jose del Cabo 50 years ago (Lamb 1927). South of the 28th parallel, the coast is very difficult to explore, requiring approach either by sea, by 4-wheel drive vehicle if overland, or preferably by both routes. We were not equipped for such exploration, but urge that it be undertaken in the near future.

Time is short. The opening of the new road heralds many changes for Baja California. Before extensive development gets underway, essential habitats for endangered species should be documented. Protection of endangered species becomes an international problem when the birds do not recognize national boundaries. A joint Mexican-United States program is needed.

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Accepted 25 August 1977

BULLETIN BOARD

COLONIAL WATERBIRD GROUP

The Colonial Waterbird Group (CWG) was officially formed at the North American Wading Bird Conference at Charleston, South Carolina, on 16 October 1977. The CWG developed from two other newly organized groups, the Colonial Wading Bird Group and the steering committee for a proposed seabird group for central and eastern North America. The organization has the following immediate goals: (1) encourage and coordinate standardized surveys of colonial waterbirds; (2) publish a newsletter; (3) assist efforts by conservationists to protect and manage colonial waterbirds and wetland and coastal ecosystems; (4) act as a clearinghouse of information for ongoing research and research opportunities.

Chairperson of the steering committee is John C. Ogden, Secretary-treasurer is Joanna Burger, and Editor of the newsletter is Mitchell Byrd. Dues are currently $5.00 per year.

Regional reporters are contacting persons working on colonial water birds or interested in doing so. To avoid duplication or competition with the Pacific Seabird Group, in the regions bordering the Pacific Coast, the CWG will be limited to colonial wading birds such as herons, ibises and storks. Westerners interested in wading birds are encouraged to write one of the following regional reporters:

The reporter for Washington, Oregon, California and Nevada is Helen M. Pratt, 337 Jean Street, Mill Valley, CA 94941.

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Occurrence and Nesting of the Least Tern and Other Endangered Species in Baja California, Mexico *Barbara W. Massey* 67

BULLETIN BOARD 70

Send rare bird reports for California to John S. Luther, College of Alameda, 555 Atlantic Avenue, Alameda, CA 94501; see Calif. Birds 2:109-110. For Arizona, send reports to Robert A. Witzeman, 4619 E. Arcadia Lane, Phoenix, AZ 85018. For Colorado, send reports to Jack Reddall, 1450 South Alton Street, Englewood, CO 80110. For Oregon, send reports to Oregon Birds, P. O. Box 3082, Eugene, OR 97403.

Manuscripts should be sent to Alan M. Craig, 3532 Winston Way, Carmichael, CA 95608. For matters of style consult *Suggestions to Contributors to Western Birds* (6 pp. mimeo available at no cost from the Editor) and *CBE Style Manual*, 3rd ed., 1972 (available from American Institute of Biological Sciences, 3900 Wisconsin Ave., NW, Washington, DC 20016 for $6.00).

Papers are desired that are based upon field studies of birds, that are both understandable and useful to amateurs, and that make a significant contribution to scientific literature. Appropriate topics include distribution, migration, status, behavior, ecology, population dynamics, habitat requirements, the effects of pollution, and techniques for identifying, censusing, sound recording and photographing birds in the field. Papers of general interest will be considered regardless of their geographic origin, but particularly desired are papers dealing with studies accomplished in or bearing on Rocky Mountain states and provinces westward, including Alaska and Hawaii; adjacent portions of the Pacific Ocean and Mexico; and western Texas.

Authors are provided 50 free reprints of each paper. Additional reprints can be ordered at author's expense from the Editor when proof is returned or earlier.

Good photographs of rare and unusual birds, unaccompanied by an article but with caption including species, date, locality and other pertinent information, should be submitted to Arnold Small, 608 N. Camden Drive, Beverly Hills, CA 90210.